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BIOLOGICAL EVALUATION

LAGUNA MOUNTAIN
BARK BEETLE MAINTENANCE CONTROL PROJECT
DESCANSO RANGER DISTRICT
CLEVELAND NATIONAL FOREST

JANUARY 1972

CALIFORNIA REGION
DIVISION OF TIMBER MANAGEMENT
BRANCH OF PEST CONTROL

FOREST SERVICE
U. S. Department of Agriculture

630 SANSOME STREET
SAN FRANCISCO, 94111

Evaluation (Insects)

5230
January 1972

BARK BEETLE MAINTENANCE CONTROL PROJECT

DESCANSO RANGER DISTRICT
CLEVELAND NATIONAL FOREST

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Bark beetle maintenance control programs have been underway in southern California since the early 1950's. Long-range insect control plans have been prepared for each Ranger District in accordance with guidelines currently located in R5 Emergency Directive No. 1, FSM 5242.22f. These control plans delineate project areas and indicate the intensity and type of treatment necessary. The control program has been approved annually by the California Forest Pest Control Action Council. The objective of maintenance control is to give the highest degree of protection feasible to recreation and timber land.

Bark beetle control first began on Laguna Mountain in 1929 and continued intermittently until 1952. During this period, most of the effort was aimed at controlling the western pine beetle. In 1952, a maintenance control program was initiated against the western pine beetle and was expanded in 1957 to include the California flatheaded borer.

The project has been very active in recent years and the following losses indicate the severity:

TREES TREATED IN LAGUNA MOUNTAINS

Fiscal Year	Forest Service	Private	Total
1962	974	-	974
1963	666	62	728
1964	375	?	375
1965	400	?	400
1966	574	?	574
1967	468	128	596
1968	315	19	334
1969	822	98	920
1970	779	28	807
1971	820	0	820
GRAND TOTAL	6,193	335	6,528

CAUSAL AGENT

The primary insects are the California flatheaded borer, Melanophila californica, in Jeffrey pine, and the western pine beetle, Dendroctonus brevicomis, in Coulter pine. The pine engraver beetles, Ips spp., and red turpentine beetle, Dendroctonus valens, will attack both pine species, but under most conditions are considered secondary. As in other southern California Forests, the California flatheaded borer is an aggressive tree killer in the absence of the Jeffrey pine beetle.

HOST TREES

The major tree species is Jeffrey pine (Pinus jeffreyi). It occurs primarily in pure stands of all age classes with occasional mixture of black oak and incense-cedar. The fringe areas support a stand of Coulter pine (Pinus coulteri).

LOCATION AND EXTENT OF INFESTATION

The infestation is located in the Laguna Mountains, Descano District, Cleveland National Forest. There are approximately 14,000 timbered acres of National Forest land and 4,900 timbered acres of private land for a total of 18,900 acres. Currently, only about 5,000 acres are included in maintenance control projects either as Class I (continuous) or Class II (seasonal)). 1/ Of this, approximately 4,300 acres are National Forest lands and 700 acres are in private ownership. The acreage under maintenance control includes all major recreational areas.

TYPE OF DAMAGE

There has been a persistent but fluctuating high incidence of bark beetle caused tree mortality. These trends change in response to adverse environmental factors.

1/ Maintenance Control is divided into four intensity classes. An additional 9,700 acres of National Forest timber land are designated as Class III and Class IV. Control is seldom warranted in these two classes, and is only justified by individual biological evaluations. The remaining private land is not included under maintenance control.

The impact of tree mortality on a recreation forest is as follows:

1. Reduced scenic value.

2. Reduction in property values.

3. Increased hazard to persons and property.

4. Increased fire hazard.

5. Direct monetary loss resulting from removal of dead trees.

ENVIRONMENTAL AND OTHER FACTORS

Current knowledge indicates that adverse environmental factors that injure trees or cause stress, reduce the tree's resistance to bark beetle attack. Several factors are influencing the current bark beetle population trends.

Moisture and Site. It has been generally accepted that periodic drought conditions have been responsible for insect outbreaks. In the Laguna Mountains, moisture is a very critical factor. Normal rainfall is 25 inches and so far in 1971 only 8.5 inches of precipitation has occurred. The last two years, 1969 and 1970, have had about 60% of normal rainfall. This lack of moisture has put serious stress on the timber stand as most growing sites are marginal. Site IV or lower are common. In addition, some of the stand is overstocked, thus, competition for growing space is critical.

Diseases. Jeffrey pine in the Laguna Mountains has been weakened by diseases over a number of years. Periodically, root rots, Armillaria mellea, and particularly Fomes annosus, have weakened or killed many trees. However, a more serious problem is the effect of dwarf mistletoe, Arceuthobium campylopodum; not only has this parasite killed many small trees, but trees with dwarf mistletoe infection are also attacked and killed by the California flatheaded borer. This is borne out in a 1957 survey which determined cause of damage to Jeffrey pine.

> "There was a close parallel between the proportion infested by flatheads and by mistletoe. In the smaller diameter classes the proportion was somewhat more than 50 percent with the percentage rising to 100 for both organisms in the larger diameter classes. This suggests that mistletoe and flatheaded borers in combination are the primary cause of the damage ... Only about one-third of the trees in each diameter class contained both flatheads and heavy or medium mistletoe infections. Another third contained flatheads but no evidence of mistletoe or only light infections. The remaining one-third had medium to heavy mistletoe infections only." 1/

1/ Trostle, Galen C. Forest Insect Conditions Report. Mount Laguna Recreation Area, Cleveland National Forest, Appraisal Survey, October 1957. California Forest and Range Experiment Station, Berkeley, California.

Fire Damage. In September 1970, the Laguna Fire burned 175,400 acres of which about 1,000 acres was timber land in the Laguna Mountains. About 500 acres were on private land. Dead or damaged trees were subsequently buried or logged by private contractors with funds provided under Public Law 91-606 through the Office of Emergency Preparedness (OEP). The administration of the project was handled by the Corps of Engineers.

An attempt was made to sell about 600 M board feet of burned timber on 500 acres of National Forest land to the Big Bear Timber Corp., Redlands. This effort failed. However, the merchantable timber was finally sold to a portable mill owner, but this operation also was not successful. Currently, the District is trying to dispose of dead or fire-damaged timber through a cordwood sale program.

BIOLOGICAL INFORMATION

The project area was examined in January. The California flatheaded borer was primarily in the late larval stage; however, a few pupae were observed. Ips were found in all stages, in slash as well as in the tops of living trees. The western pine beetle was primarily in the larval stage, but the number of trees infested with this bark beetle is small. An increase in tree mortality caused by the California flatheaded borer and ips is predicted for 1972, while western pine beetle caused tree mortality will remain low.

DISCUSSION

So far it has not been feasible to have a sanitation cutting in the Laguna Mountains. This is primarily because of the distance, about 150 miles, to the nearest sawmill, and the low quality of the timber. However, circumstances change and renewed effort should be made to have a sanitation cutting in order to increase stand vigor.

The Forest Service annually treats about 700 acres of private land in order to make the suppression project biologically sound. Additional private land should be treated but the infestation on this area does not seriously threaten National Forest land. In the past, private owners have not been interested in financing a cooperative insect control project. However, it has recently come to light that perhaps financing for the private share may be available from the San Diego County general fund. The possibility of initiating a cooperative insect control project should be fully investigated with the California Division of Forestry.

A dwarf mistletoe control program has been in progress in the Laguna Mountains for a number of years. This program should be continued along with other silvicultural measures to help increase stand vigor. Additionally, the relationship between root rot, dwarf mistletoe infection and California flatheaded borer attacks on Jeffrey pine is not fully understood and needs to be studied.

The California flatheaded borer is not normally considered to be an important tree killer, but it has unique status in southern California as a primary pest in many areas including the Laguna Mountains. Unfortunately, the reasons for this are not understood. Therefore, it would be desirable to have a study on the population dynamics of the California flatheaded borer in southern California. When such information becomes available, sounder timber management decisions for controlling this insect may be made.

RECOMMENDATIONS

The practice of evaluating bark beetle infestations has not yet developed into an exact science. Although improved tools and methods are under development for evaluation, these are not yet available, and as in the past, the need for suppression is judged primarily on the basis of tree mortality and the environmental factors affecting the area.

Five recommendations are made which should help to control the chronic infestation in the Laguna Mountains.

1. Continue the maintenance control program on both National Forest and private land.

   Considering the high recreation and property values at stake; recognizing that increasingly unfavorable environmental factors of drought, air pollution damage and fire damage will probably cause increased bark beetle damage; this is the best method available to attain minimal loss levels in recreation and urbanized forests. Maintenance control includes the following practices which should be given consideration in the following order of priority:

   (1) Sanitation cutting should be initiated on National Forest land and private land where it is feasible.

   (2) Silvicultural treatment in overstocked stands should be continued and/or initiated on all ownerships.

   (3) When possible, removal of insect-infested trees should be accomplished by salvage logging or woodcutters. Be certain infested material is removed from the forest environment.

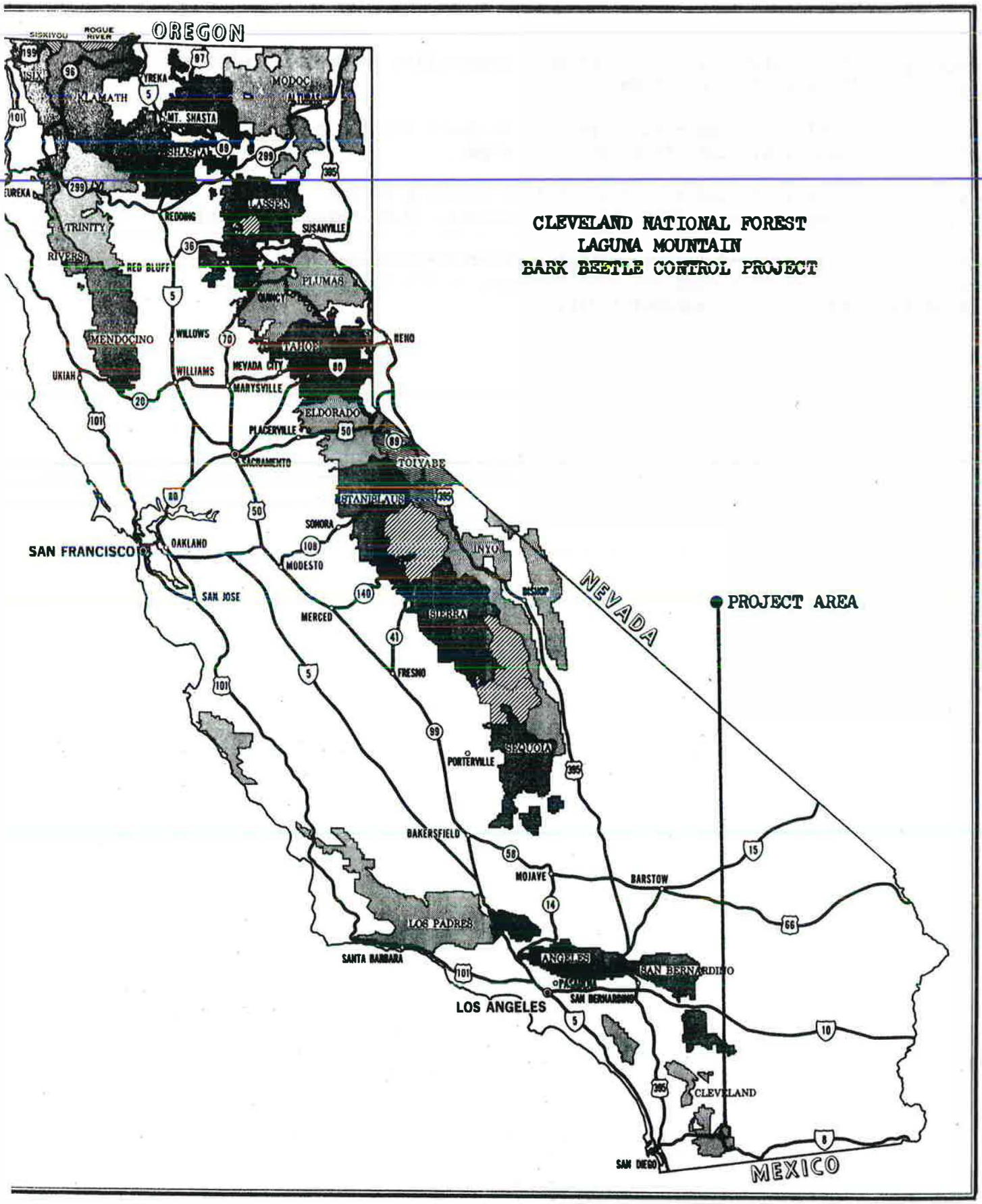
   (4) When necessary, infested trees can be treated with a 1.5% lindane spray. Application instructions are found in R5 FSM 5240, Emergency Directive No. 1, dated May 3, 1968. Lindane applied in accordance with these instructions will have minimal adverse effects on human health, wildlife, fish or domestic animals.

2. Investigate the possibility of initiating a cooperative insect control project with the California Division of Forestry.

3. Continue the evaluation and control program on dwarf mistletoe in order to increase individual tree and stand vigor.

4. A study should be initiated on the population dynamics of the California flatheaded borer in southern California. (R.O. responsibility)

5. A study should be started to determine the interrelationship and and effect of dwarf mistletoe and root diseases on the California flatheaded borer. (R.O. responsibility)


CLEVELAND NATIONAL FOREST
LAGUNA MOUNTAIN
BARK BEETLE CONTROL PROJECT
PROJECT AREA
OREGON
NEVADA
MEXICO
SAN FRANCISCO
LOS ANGELES
SAN DIEGO
CLEVELAND
SISKIYOU
ROGUE RIVER
KLAMATH
YREKA
MODOC
MT. SHASTA
SHASTA
LASSEN
SUSANVILLE
REDDING
TRINITY
RIVERS
RED BLUFF
PLUMAS
QUINCY
MENDOCINO
WILLOWS
TAHOE
RENO
UKIAH
WILLIAMS
NEVADA CITY
MARYSVILLE
ELDORADO
PLACERVILLE
SACRAMENTO
TOIYABE
STANISLAUS
SONORA
OAKLAND
MODESTO
INYO
BISHOP
SAN JOSE
MERCED
SIERRA
FRESNO
SEQUOIA
PORTERVILLE
BAKERSFIELD
MOJAVE
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LOS PADRES
SANTA BARBARA
ANGELES
SAN BERNARDINO

January 1972